SBI3U Genetics Name: _____

Date: _____

Sex-Linked Problems

1. Hemophilia (bleeder's disease) is due to a recessive sex-linked gene only found on the X chromosome. If a normal blood clotting X^H is dominant to hemophilia X^h, then what would be the genotype of the following individuals?

a. Homozygous non-hemophilic woman _____
b. Non-hemophilic man _____
c. Heterozygous non-hemophilic woman _____
d. Hemophilic man _____
e. Hemophilic woman _____

2. A normal man marries a normal woman heterozygous for the hemophilia gene (a carrier). Hemophilia will likely occur in _____% of their male children and _____% of their female children. Complete the punnett square

Genotype of the man: _____
Genotype of the woman: _____

Punnett Square:

3. A hemophiliac man marries a homozygous normal woman. Probability of having hemophilia and male is _____%. Probability of having hemophilia and be female is _____%.

Genotype of the man: _____
Genotype of the woman: _____

Punnett Square:

4. A hemophiliac man marries a normal woman whose father had hemophilia. Hemophilia will likely occur in _____% of male children and _____% of female children.

Genotype of the man: _____
Genotype of the woman: _____

Punnett Square:

5. Duchenne muscular dystrophy is a sex-linked disorder that is caused by a defective recessive gene located on the X chromosome. The disorder results in a wasting away of muscles and the individual usually dies by the age of 20. The gene X^D is for normal muscles and is dominant. The gene X^d is for muscular dystrophy, but is recessive.

   The father is normal (X^DY) and the mother is a carrier (X^DX^d) for muscular dystrophy.
   From all the possible offspring combinations, what are the chances in percentages for having children with the following characteristics?

a. a son who has muscular dystrophy: _____%
b. a daughter who has MD: _____%
c. a daughter who is a carrier: _____%
d. a son who is non-muscular dystrophy: _____%

Punnett Square:

6. In humans, red-green colour blindness is a sex-linked recessive trait with the gene located only on the X chromosome. If the X^E represents the gene for normal colour vision and X^e represents the gene for colour blindness, indicate the phenotypes and ratios for the following situation: The mother is homozygous normal and the father is colour blind.

_____ **X** _____

a. a female with normal vision: _____%
b. a female who is colourblind: _____%
c. a male with normal vision: _____%
d. a male who is colourblind: _____%

Punnett Square:
